

IN THE CLAIMS

Claims 9-15 (Group II), 30-34 (Group III), and 35-36 (Group IV) have previously been cancelled without prejudice as being drawn to non-elected distinct inventions under 35 U.S.C. § 121.

Claims 4-8 and 29 has also previously been cancelled without prejudice.

Please amend claims 1-2, 16-25, 28, and 37.

Please cancel claim 3 without prejudice.

Please enter the pending claims, including claims 1-2, 16-28, and 37 (Group I), as follows:

1. (Currently Amended) A method comprising:

~~patterning providing a substrate with a substantially arbitrary arrangement of features, comprising;~~

~~patterning forming an array of repeating lines and spaces between the lines in~~
~~an a first photoresist layer over the substrate with a high resolution system wherein~~
~~the array comprises repeating parallel lines and spaces; [[,]]~~

~~introducing irregularity into an area on the substrate covered by the array of repeating lines and spaces, wherein introducing irregularity comprises~~

~~forming an arbitrary figure arbitrarily-shaped features in a second photoresist layer above the array with a low resolution system, wherein the arbitrarily-shaped features overlap some of the lines and spaces in the array; arbitrary figure comprises a first feature and a second feature that are noncontiguous and that each bridge one or more of~~

~~etching the substrate through portions of the array not covered by the arbitrarily-shaped features;~~

~~reducing continuity of the lines and spaces overlapped by the arbitrarily-shaped features; and~~

~~introducing irregularity into the array repeating lines and spaces at different longitudinal positions.~~

2. (Currently Amended) The method of claim 1, wherein the forming the array in the first photoresist over the substrate and the forming the arbitrary figure arbitrarily-shaped features comprises exposing and developing in the second photoresist layer above the array comprise exposure with the same wavelength.

3.-15. (Cancelled)

16. (Currently Amended) A method comprising:

~~interfering electromagnetic radiation~~ a pair of collimated laser beams to illuminate a substrate ~~with an interference pattern, the interference pattern imparting~~ a first photoresist layer on the a substrate with;

forming repeating periodic lines and spaces in the first photoresist layer; and
~~introducing irregularity into an area on the substrate covered by the repeating lines and spaces to impart an arbitrary feature arrangement to the substrate, wherein introducing irregularity comprises forming an arbitrary figure~~ arbitrarily-shaped features in a second photoresist layer above ~~a portion of the repeating periodic lines and spaces, wherein the arbitrarily-shaped features shield portions of the periodic lines and spaces~~ arbitrary figure comprises a first feature and a second feature that are noncontiguous and that each bridge one or more of the repeating lines and spaces at different longitudinal positions

forming a series of trenches in the substrate below the portions of the lines not shielded by the arbitrarily-shaped features;

eliminating continuity of the lines that are shielded by the arbitrarily-shaped features; and

introducing irregularity into the periodic lines and spaces.

17. (Currently Amended) The method of claim 16, wherein the introducing irregularity into the periodic lines and spaces comprises ~~ending~~ eliminating continuity of ~~a trench~~ the trenches at an ~~arbitrary~~ different longitudinal positions ~~position along the trenches trench.~~

18. (Currently Amended) The method of claim 16, wherein the introducing ~~the~~ irregularity further comprises exposing and developing the second photoresist layer above ~~the portion of the repeating~~ periodic lines and spaces.

19. (Currently Amended) The method of claim 16, wherein the introducing ~~the~~ irregularity further comprises transferring the ~~arbitrary figure~~ arbitrarily-shaped features to ~~the portion of the repeating~~ periodic lines and spaces.

20. (Currently Amended) The method of claim 19, wherein the introducing the irregularity further comprises ~~patterning~~ etching the substrate below the periodic lines and spaces ~~using the arbitrary figure to define the arbitrary feature arrangement.~~

21. (Currently Amended) The method of claim 16, wherein interfering electromagnetic radiation a pair of collimated laser beams comprises imparting, to the substrate, ~~first features~~ periodic lines and spaces ~~having a pitch yielding a k₁ factor approaching 0.25 in a single patterning step.~~

22. (Currently Amended) A method comprising:

patterning a first layer on a substrate using a first lithographic technique, the patterning providing alternating lines and spaces in [[a]] the first layer with a first

pitch yielding a first k_1 factor smaller than or equal to 0.5;

printing, in a photoresist layer using a second lithographic technique providing a second pitch, a first feature to ~~bridge~~ overlap a first collection of one or more of the repeating lines and spaces at a first longitudinal position, a second feature to ~~bridge~~ overlap a second collection of one or more of the repeating lines and spaces at a second longitudinal position, and a third feature to ~~bridge~~ overlap a third collection of one or more of the repeating lines and spaces at a third longitudinal position, wherein the first feature, the second feature, and the third feature are noncontiguous and wherein the second pitch is two or more times larger than the first pitch; and

etching the substrate to transfer, to the substrate, a superposition of the lines and spaces with the first feature, the second feature, and the third feature, wherein the continuity of at least the first collection, the second collection, and the third collection is broken in the transferred superposition.

23. (Currently Amended) The method of claim 22, wherein patterning the first layer on the substrate using the first lithographic technique comprises providing ~~first~~ alternating lines and spaces with the first pitch yielding the first k_1 factor approaching 0.25 for a single patterning step.

24. (Currently Amended) The method of claim 22, wherein ~~patterning the first layer on the substrate using~~ the first lithographic technique comprises ~~patterning the substrate using~~ interference lithography.

25. (Currently Amended) The method of claim 22, wherein ~~printing the first feature, the second feature, and the third feature~~ the second lithographic technique comprises ~~patterning~~ printing using a binary mask.

26. (Previously Presented) The method of claim 22, wherein printing the first feature, the second feature, and the third feature comprises using the second lithographic technique providing the first feature, the second feature, and the third feature with the second pitch yielding the second k_1 factor greater than 0.5.

27. (Previously Presented) The method of claim 22, wherein breaking the continuity further comprises exposing and developing the photoresist layer.

28. (Currently Amended) The method of claim 22, wherein etching the substrate comprises etching a portion of the substrate not covered by the ~~arbitrary figure~~ first feature, the second feature, and the third feature.

29.-36. (Cancelled).

37. (Currently Amended) A method comprising:

patterning a first layer of photoresist on a substrate using interference lithography to provide a collection of periodic lines and spaces having a first pitch;

patterning a second layer of photoresist using a second lithographic technique to provide an arbitrary feature with a second pitch, wherein the second pitch is two or more times larger than the first pitch and wherein the arbitrary figure comprises a first feature and a second feature that are noncontiguous and that each ~~bridge~~ overlaps one or more of the ~~repeating~~ periodic lines and spaces at different longitudinal positions; and

etching the substrate to transfer a superposition of the lines and spaces provided by patterning the first layer and the arbitrary feature provided by patterning the second layer to the substrate, wherein the continuity of at least one of the lines and spaces is broken at the different longitudinal positions in the transferred superposition.